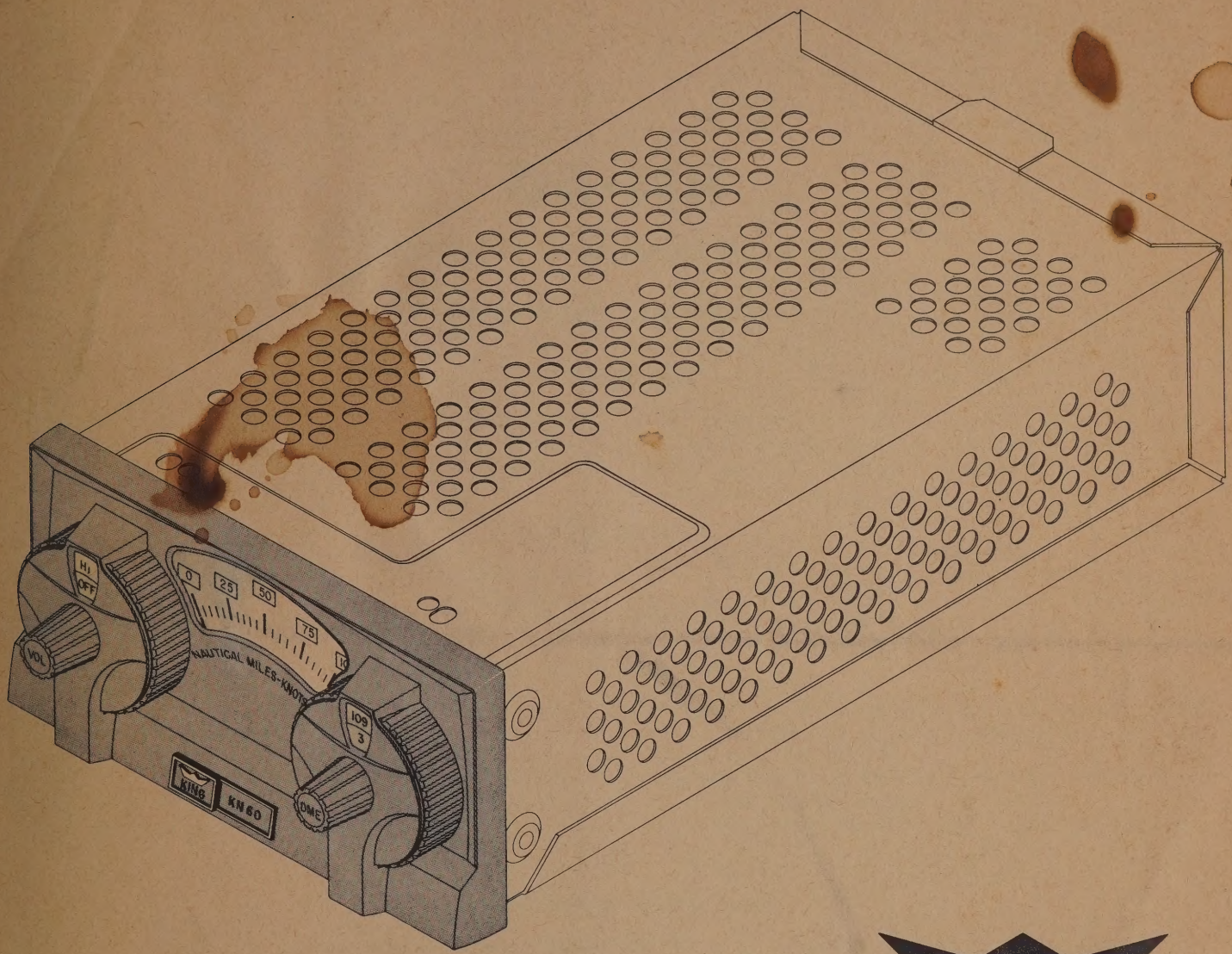
Builders of TOMORROW'S Aircraft Equipment TODAY!



KING

Instruction Manual

KN-60

DISTANCE
MEASURING
EQUIPMENT

ONE FULL YEAR WARRANTY

King Radio Corporation, Inc., Olathe, Kansas, has designed, engineered and constructed this equipment with the finest material and components available. This equipment has been thoroughly tested and inspected before leaving the factory.

King Radio Corporation, Inc., (hereinafter called King), warrants each item of new equipment manufactured by it to be free from defects in material under normal use for which intended for one year from the effective date of the warranty certificate.

King will hereunder replace or repair (at King's discretion) at any of King's certified Dealers, any King part or component (including vacuum tubes and transistors), which shall within such warranty period, be returned, transportation charges prepaid to any King certified Dealer. Any King certified Dealer may perform work under the terms of this warranty. Such Dealer, if authorized in advance by King, may return the part or unit to King's factory for compliance with this warranty. This warranty of parts includes, for the first ninety (90) days thereof, bench time required to locate the defect, repair same or replace such part.

THIS WARRANTY SHALL NOT APPLY TO ANY UNIT OR PART THEREOF, WHICH, IN THE JUDGMENT OF KING, HAS NOT BEEN INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS PROVIDED IN THE MAINTENANCE MANUAL, OR HAS BEEN REPAIRED OR ALTERED IN ANY WAY SO AS ADVERSELY TO AFFECT ITS PERFORMANCE OR RELIABILITY, OR WHICH HAS BEEN SUBJECTED TO MISUSE, NEGLIGENCE OR ACCIDENT.

This warranty is in lieu of all other guaranties or warranties expressed or implied. The obligation and responsibility of King for, or with respect to, defective equipment shall be limited to that expressly provided herein and King shall not be liable for consequential or other damage or expense whatsoever therefor or by reason thereof.

King reserves the right to make changes in design or additions to or improvements in its equipment without obligation to install such additions or improvements in equipment theretofore manufactured.

KN-60

DISTANCE MEASURING EQUIPMENT

PERFORMANCE SPECIFICATIONS

INTERROGATOR

CRYSTAL CONTROLLED	- 100 UHF Channels.	POWER OUTPUT	- 50 watts minimum.
FREQUENCY RANGE	- 1041 Mc to 1150 Mc.		
FREQUENCY STABILITY	- ±0.01% under normal environmental conditions.	MAXIMUM ALTITUDE	- Operational up to 30,000 feet altitude.

RECEIVER SECTION

CRYSTAL CONTROLLED	- 100 UHF Channels.	UNDESIRED RESPONSES	- Down at least 35db.
FREQUENCY RANGE	- 978 Mc to 1213 Mc.	SENSITIVITY	- Will lock-on and track a -80dbm signal with a 70% reply efficiency.
AUDIO OUTPUT	- 30mw into a 600Ω load; adjustable output.		
SPEED	- 50 to 250 Knots.	DECODER REJECTION	- Will reject signals with 6us/18us pulse spacings by at least 30db.
SPEED ACCURACY	- ±5 knots or ±5% (whichever is greater).		
RANGE	- 0 to 100 Nautical Miles.		
RANGE ACCURACY	- ±0.5 nm or ±3% (whichever is greater).	MEMORY HOLD	- 8 seconds minimum.
TRACKING SPEED	- Greater than 400 knots.	SEARCH TIME	- 0 - 20 nm —— 4 Sec. Max. 0 - 100 nm — 20 Sec. Max.

TOTAL POWER DRAIN (TYPICAL)

13.75 Volts —————— 5 Amps

27.5 Volts —————— 2.4 Amps

GENERAL INFORMATION

The King KN-60 is a Distance/Ground Speed Measuring unit. This compact, lightweight, and completely self-contained unit is primarily designed for use in light and medium aircraft at altitudes up to 30,000 ft..

The KN-60 electronically converts elapsed time to distance, by measuring the length of time between the transmission of a radio signal to a pre-selected VOR/DME station and reception of the reply signal. This distance is then indicated in nautical miles on the DME Range/Speed Indicator. (Distances of 0-100 miles in 5 mile increments or 0-20 miles in expanded scale 1 mile increments.) This distance, measured on a slant, from air to ground, is commonly referred to as slant-range distance and should not be confused with actual ground distance. The difference between ground distance is smallest at low altitude and long range. These distances may differ considerably when in close proximity to a VOR/DME facility, however, if the range is 3 times the altitude or greater, this error is negligible.

GENERAL

The effective range of DME depends on many factors; most important being the altitude of the aircraft. Other contributing factors to DME's effective range are the location and altitude of ground transmitter, transmitter power output, degree of maintenance of the KN-60, and maintenance of the ground facility.

The tracking speed incorporated in the KN-60 measures the rate of change in DME range with time. This speed is then read from 50 to 250 knots in 10 knot increments when the Speed Section is selected on the Range/Speed Indicator.

The KN-60, a panel mounted unit, contains the complete transmitter, receiver, range & speed circuitry, power supply and range/speed indicator. This unit can be installed in either a 14 volt or 28 volt aircraft by simply placing the power supply switch in the desired position, and installing the correct fuse and panel lamps.

DESIGN FEATURES

COMPLETELY SELF-CONTAINED UNIT -
With Power Supply, Transmitter, Receiver, and Range/Speed Indicator.

FOUR FRONT PANEL CONTROLS -
Volume ON/OFF, VOR/DME Frequency Selector, Range/Speed Selector (3 Position - LO, HI, KTS).

COMPLETELY CRYSTAL CONTROLLED -
100 UHF Channels.

DUAL RANGE INDICATION -
Gives distances from 0 to 100 miles in 5 mile increments in one position and expanded scale 1 mile increments from 0 to 20 miles in the second position.

AIRLINE QUALITY ANTENNA -
Will withstand pressurization.

MEMORY HOLD -
Will hold last signal received 8-12 seconds, thus eliminating new "search operation" when signal is momentarily interrupted.

AUDIO OUTPUT -
Earphone audio for station identification or thru an external audio amplifier for speaker audio.

COMPACT -
3.25" high by 6.50" wide by 10.87" long.

LIGHTWEIGHT -
Only 7 pounds 8 ounces.

INSTALLATION

KN-60 INSTALLATION

Carefully plan the location of the KN-60, taking into consideration the following factors before a definite location is selected.

As heat is a principal factor in the longevity of this unit, the KA-16, Ram Air Cooling Kit, is provided with the KN-60 and must be installed to insure reliability and long life.

WARRANTY ON KN-60 IS INVALID IF KA-16, RAM AIR COOLING KIT, IS NOT INSTALLED.

Make certain that the planned location leaves space-
1. For pendant cables and connectors.
2. To attach air circulation hose.
3. For easy access to the quarter-turn wing nut on the rear of the equipment cover.

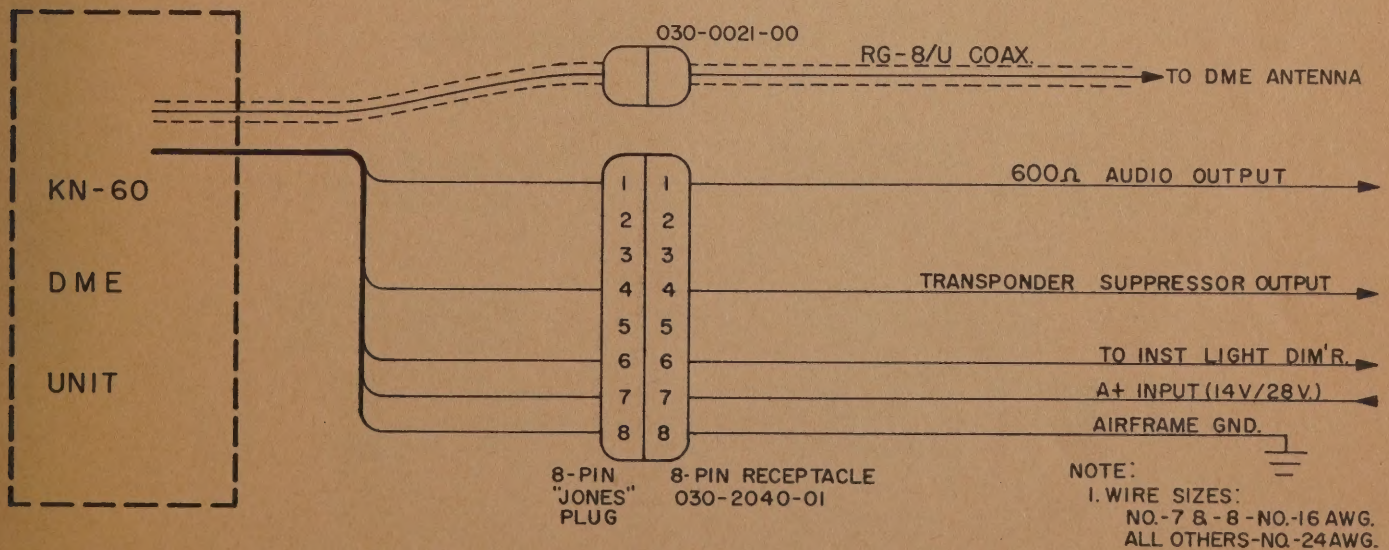


FIGURE-1 KN-60 EXTERNAL CABLE DIAGRAM

KN-60 INSTALLATION

When the desired location for the KN-60 has been carefully selected, a rectangular opening 6.18" wide by 3.08" high must be cut in the instrument panel. CAUTION: The panel opening must be accurately sized, as the face plate of the KN-60 is not much larger than the opening through which the unit must pass, therefore, the face plate will not conceal irregularities in the cutout.

Remove the DME unit from the equipment cover. Mount the equipment cover from the rear of the instrument panel (front edge of the equipment cover should be flush with the face of the instrument panel), attaching angle brackets from the backside of the instrument panel to the front section of the equipment cover. Next, attach a sturdy supporting bracket extending from the rear of the equipment cover to a nearby structural member of the airframe. (See Installation Drawing, Fig. 3, for mounting holes and machine screw sizes.)

CAUTION: Before returning the unit back to the equipment cover, a final inspection should be made of the following to insure proper functioning of the KN-60.

a. Check - Voltage Change-over Switch -- Cont'd. -Switch should be positioned toward the center for 28 volt operation and toward the side of the unit for 14 volt operation.

b. Check - Panel Lamps -- #330R for 14 volt system, #327R for 28 volt system.

c. Check - Fuse -- 6 Amp for 14 volt system, 3 Amp for 28 volt system.

d. Check - Tubes and Tube Shields -- Secure firmly.

e. Check - For easier identification of cables in a radio stack-up, affix the Marking Tape "DME" to mating power cable connector within the aircraft.

Slide the KN-60 back into the equipment cover and secure in place with the quarter-turn wing nut at the rear of the equipment cover; attach air hose, antenna and pendant cable connectors.

ELECTRICAL INSTALLATION

For wiring connections and wire sizes, See Fig. 1.

TRANSPONDER SUPPRESSION

50 volts positive, 20 microseconds pulse available for use with Transponder or similar equipment without modification to the KN-60.

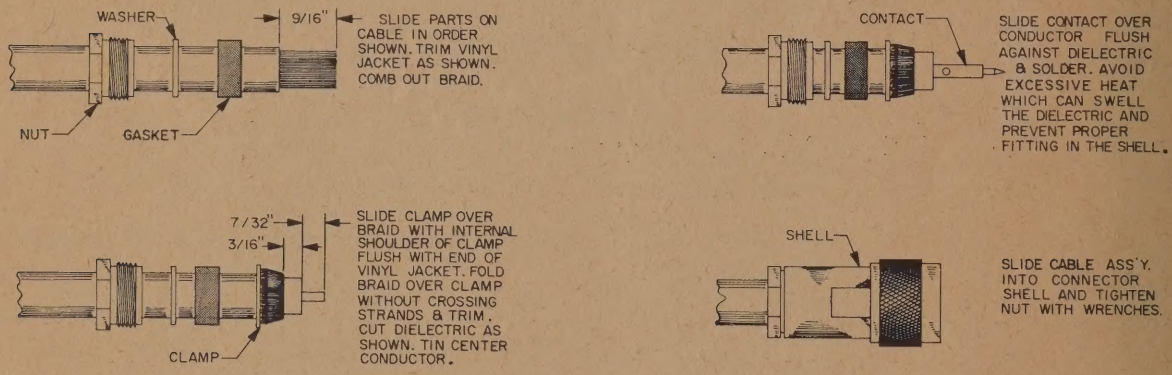

WASHER
9/16"
SLIDE PARTS ON CABLE IN ORDER SHOWN. TRIM VINYL JACKET AS SHOWN. COMB OUT BRAID.
NUT
GASKET
CONTACT
SLIDE CONTACT OVER CONDUCTOR FLUSH AGAINST DIELECTRIC & SOLDER. AVOID EXCESSIVE HEAT WHICH CAN SWELL THE DIELECTRIC AND PREVENT PROPER FITTING IN THE SHELL.
7/32"
3/16"
SLIDE CLAMP OVER BRAID WITH INTERNAL SHOULDER OF CLAMP FLUSH WITH END OF VINYL JACKET. FOLD BRAID OVER CLAMP WITHOUT CROSSING STRANDS & TRIM. CUT DIELECTRIC AS SHOWN. TIN CENTER CONDUCTOR.
CLAMP
SHELL
SLIDE CABLE ASS'Y. INTO CONNECTOR SHELL AND TIGHTEN NUT WITH WRENCHES.

FIGURE-2A STANDARD "N" CONNECTOR ASS'Y.

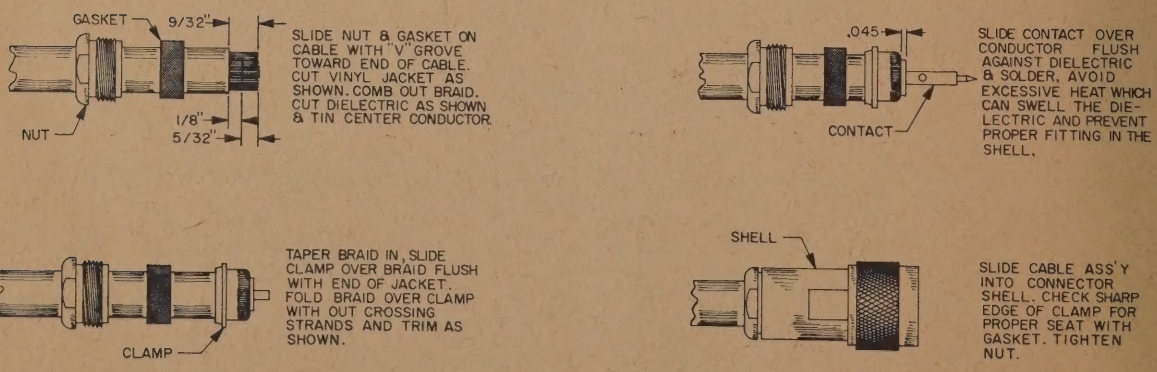
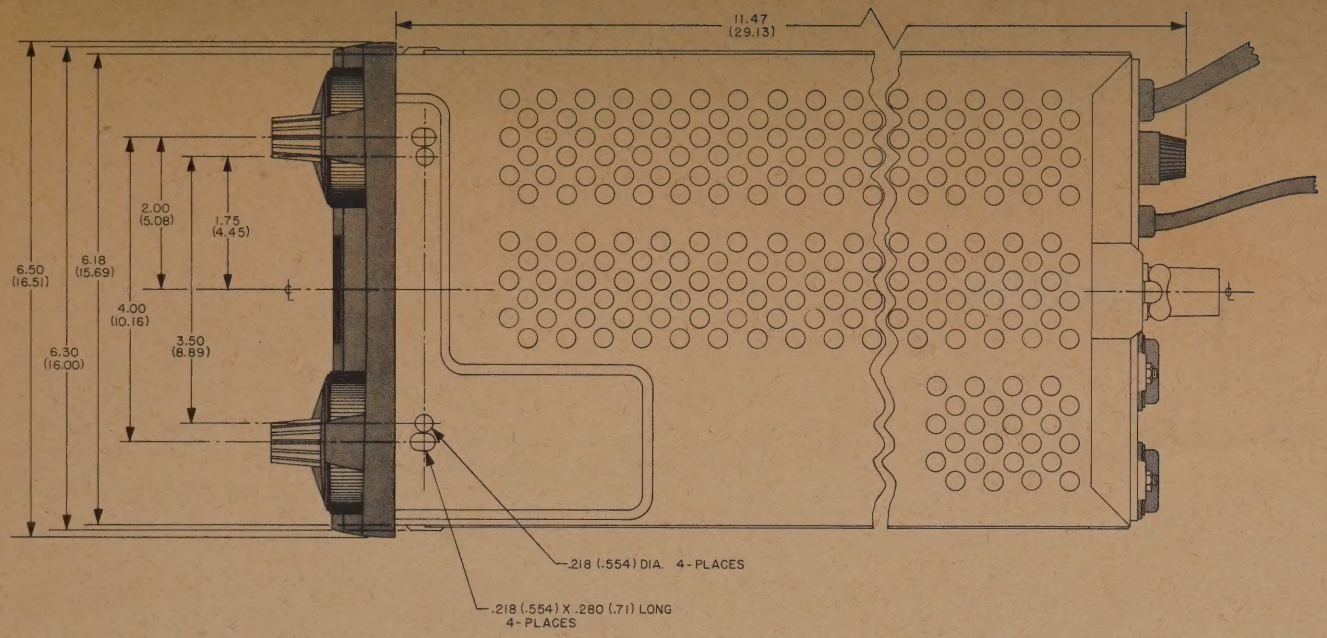
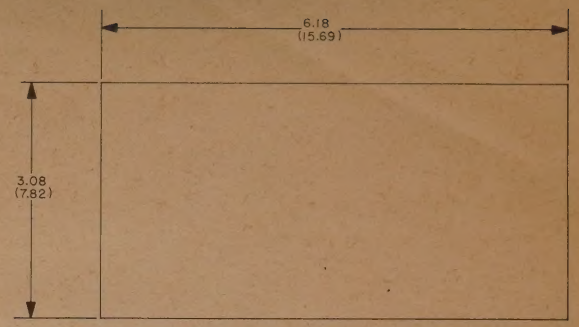

GASKET
9/32"
SLIDE NUT & GASKET ON CABLE WITH "V" GROVE TOWARD END OF CABLE. CUT VINYL JACKET AS SHOWN. COMB OUT BRAID. CUT DIELECTRIC AS SHOWN & TIN CENTER CONDUCTOR.
NUT
1/8"
5/32"
.045
CONTACT
SLIDE CONTACT OVER CONDUCTOR FLUSH AGAINST DIELECTRIC & SOLDER, AVOID EXCESSIVE HEAT WHICH CAN SWELL THE DIELECTRIC AND PREVENT PROPER FITTING IN THE SHELL.
TAPER BRAID IN, SLIDE CLAMP OVER BRAID FLUSH WITH END OF JACKET. FOLD BRAID OVER CLAMP WITH OUT CROSSING STRANDS AND TRIM AS SHOWN.
CLAMP
SHELL
SLIDE CABLE ASS'Y INTO CONNECTOR SHELL. CHECK SHARP EDGE OF CLAMP FOR PROPER SEAT WITH GASKET. TIGHTEN NUT.

FIGURE-2B IMPROVED "N" CONNECTOR ASS'Y.

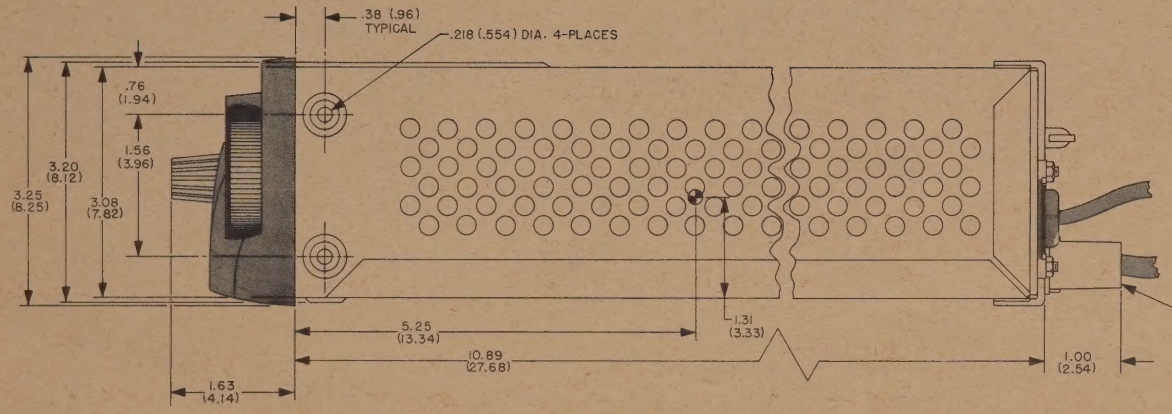




CUTOUT DIMENSIONS FOR PANEL MOUNTING.

NOTE: DIMENSIONS IN PARENTHESES ARE IN CENTIMETERS

WEIGHT: 7 LBS. 8 OZ.



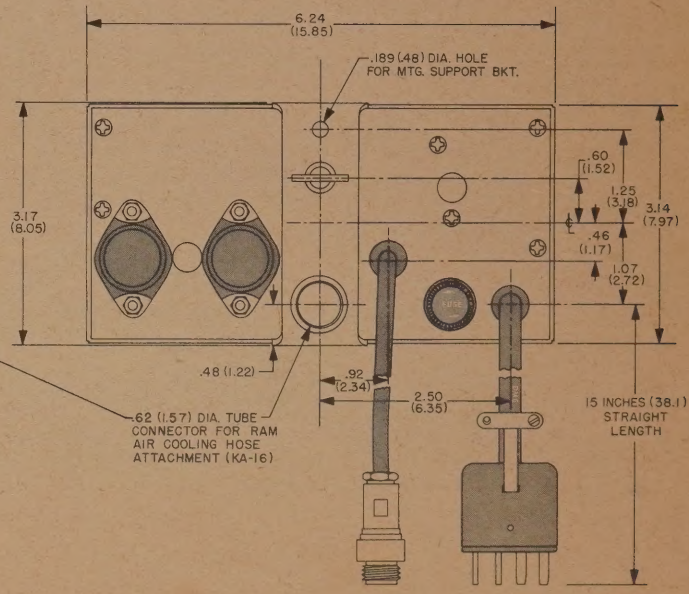


FIGURE-3 KN-60 DME INSTALLATION DRAWING

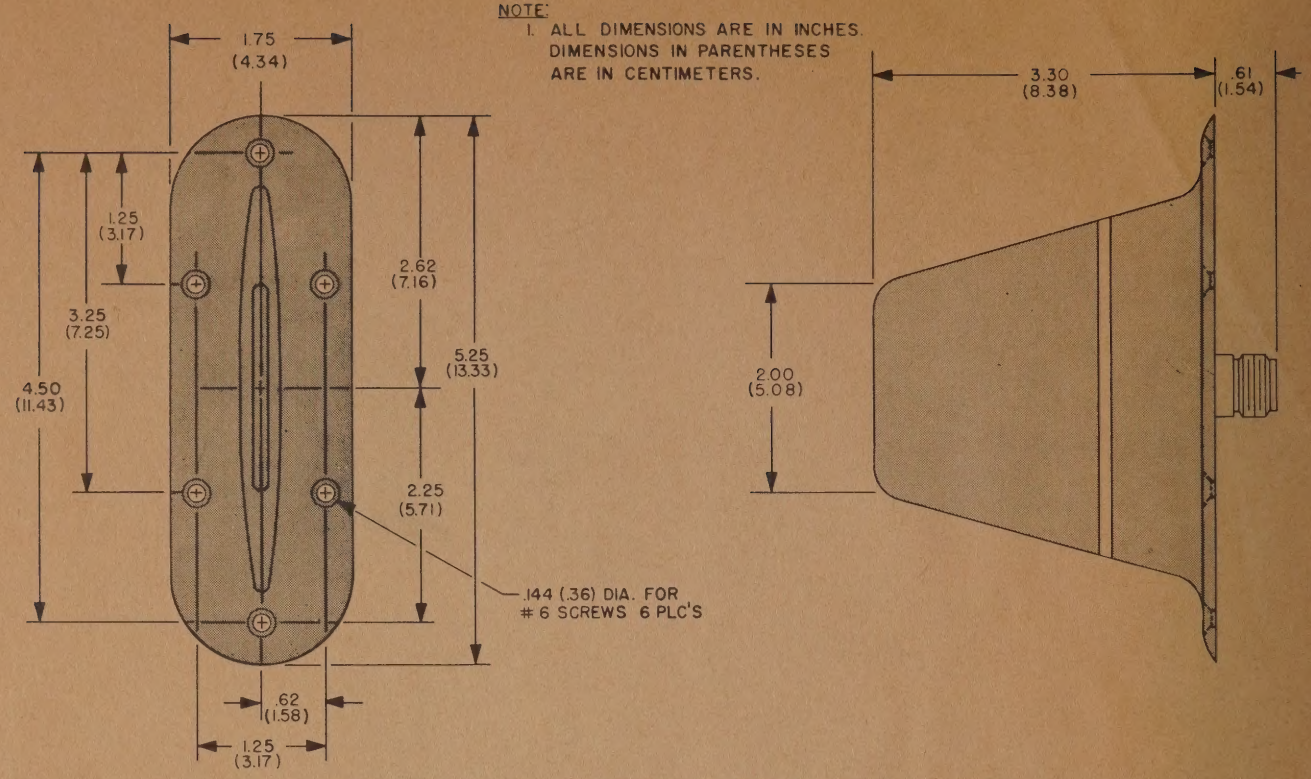


FIGURE - 4 KA-15 ANTENNA INSTALLATION DRAWING

KA-15 ANTENNA INSTALLATION

The KA-15, "L" Band Antenna, is used for both the receiver and transmitter sections of the KN-60. It may prove beneficial to investigate a successful antenna installation in other aircraft, especially if the antenna and/or aircraft are similar to yours. NOTE: For aircraft that will be operating under icing conditions, skin thickening should be provided for added strength.

RG-8/U cable is supplied with the KA-15 Antenna. Other types of cable equivalent to RG-8/U may be used. See Fig. 2A and Fig. 2B for proper assembly of connectors. The right angle connector is connected to the antenna and the straight connector to the KN-60 unit.

The antenna should be kept clean; if left dirty (oil covered) the range of the DME may be affected.

LOCATION CONSIDERATIONS

1. The antenna should be well removed from any projections, the engine(s) and propeller(s).
2. Antenna should be mounted on bottom surface of aircraft and in a vertical position when the aircraft is in a level position.
3. Avoid running cables or wires near either side of the antenna cable.
4. Where practical, plan the antenna location to keep cable lengths as short as possible, and avoid sharp bends in the cable.

KA-16 RAM AIR COOLING INSTALLATION

The King KA-16 must be installed with your King unit. Warranty will be void unless the unit is used in conjunction with the King KA-16, Ram Air Cooling Kit. Any alternate cooling method must be approved in writing by the factory.

Heat being a principle factor in the longevity of the unit, the KA-16 eliminates heat problems that could result from the installation of the unit. It allows the unit to be installed anyplace on the panel. Some other heat generating equipments mounted on the aircraft panel may also be cooled with the KA-16. The extra fitting on the KA-16 is for this purpose and needs only the duct tubing and a fitting for the unit to be cooled.

Location of the KA-16 can be on either side of the aircraft, at least 12 inches below the unit and somewhat forward of the instrument panel. Before drilling and cutting the opening, check that manifold is aimed forward (front of the aircraft) as in the Installation Drawing. Drill and cut opening using King template 155-5007-00. The 3/32 inch drain hole MUST BE ON THE BOTTOM as per template.

Install parts in order as shown. Use zinc chromate sealer, MIL-P-8116 or equivalent, in area as shown (Fig. -5). Installation is completed by attaching duct tubing to manifold and to the rear of the equipment cover of the unit to be cooled. If this is the only unit to be cooled, cap remaining vent.

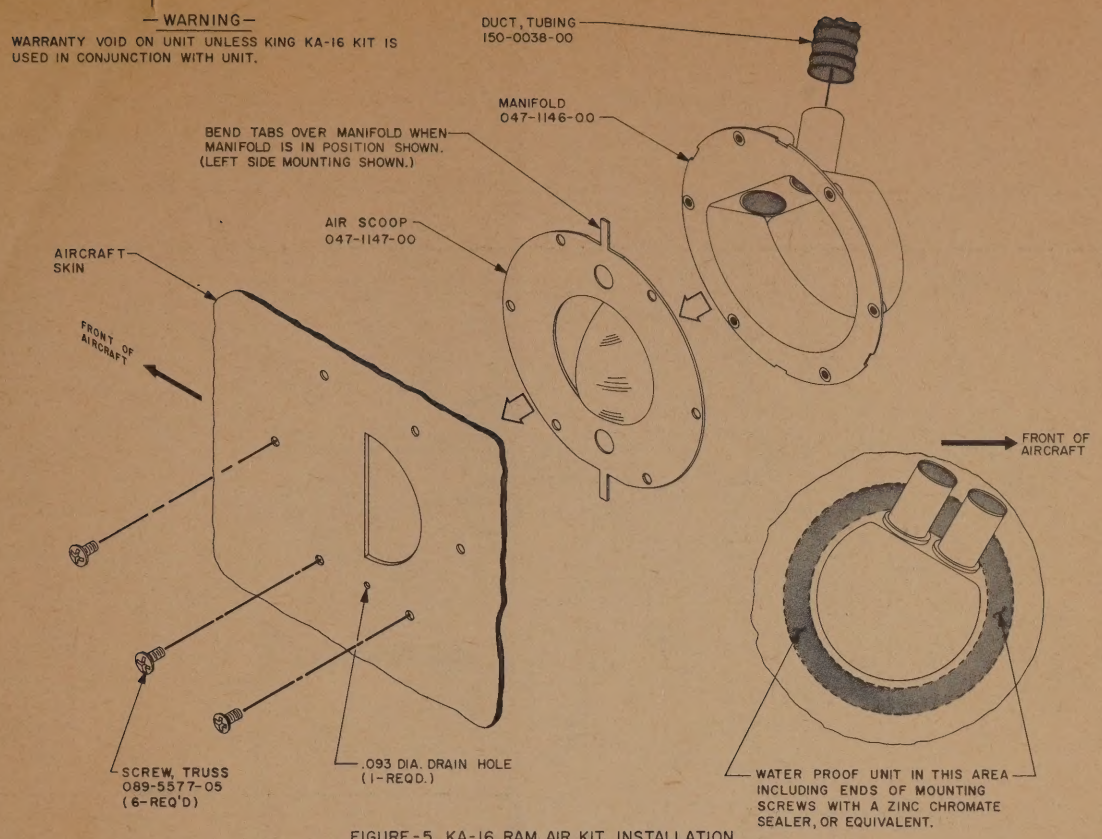

—WARNING—
WARRANTY VOID ON UNIT UNLESS KING KA-16 KIT IS USED IN CONJUNCTION WITH UNIT.
DUCT, TUBING 150-0038-00
MANIFOLD 047-1146-00
BEND TABS OVER MANIFOLD WHEN MANIFOLD IS IN POSITION SHOWN. (LEFT SIDE MOUNTING SHOWN.)
AIR SCOOP 047-1147-00
AIRCRAFT SKIN
FRONT OF AIRCRAFT
FRONT OF AIRCRAFT
SCREW, TRUSS 089-5577-05 (6-REQ'D)
.093 DIA. DRAIN HOLE (1-REQD.)
WATER PROOF UNIT IN THIS AREA INCLUDING ENDS OF MOUNTING SCREWS WITH A ZINC CHROMATE SEALER, OR EQUIVALENT.

FIGURE-5 KA-16 RAM AIR KIT INSTALLATION

OPERATION

The volume knob (marked VOL, left side of unit) is rotated clockwise from the OFF position to apply power to the set. In turning the set on, rotate the VOL knob clockwise about one-half turn.

WARNING: Radio should be turned off before starting aircraft engine(s).

After the initial warm-up period and with the Range selector in either LO or HI range position, the DME will start to search. This "search operation" is a moving of the needle from minimum to maximum range and back again.

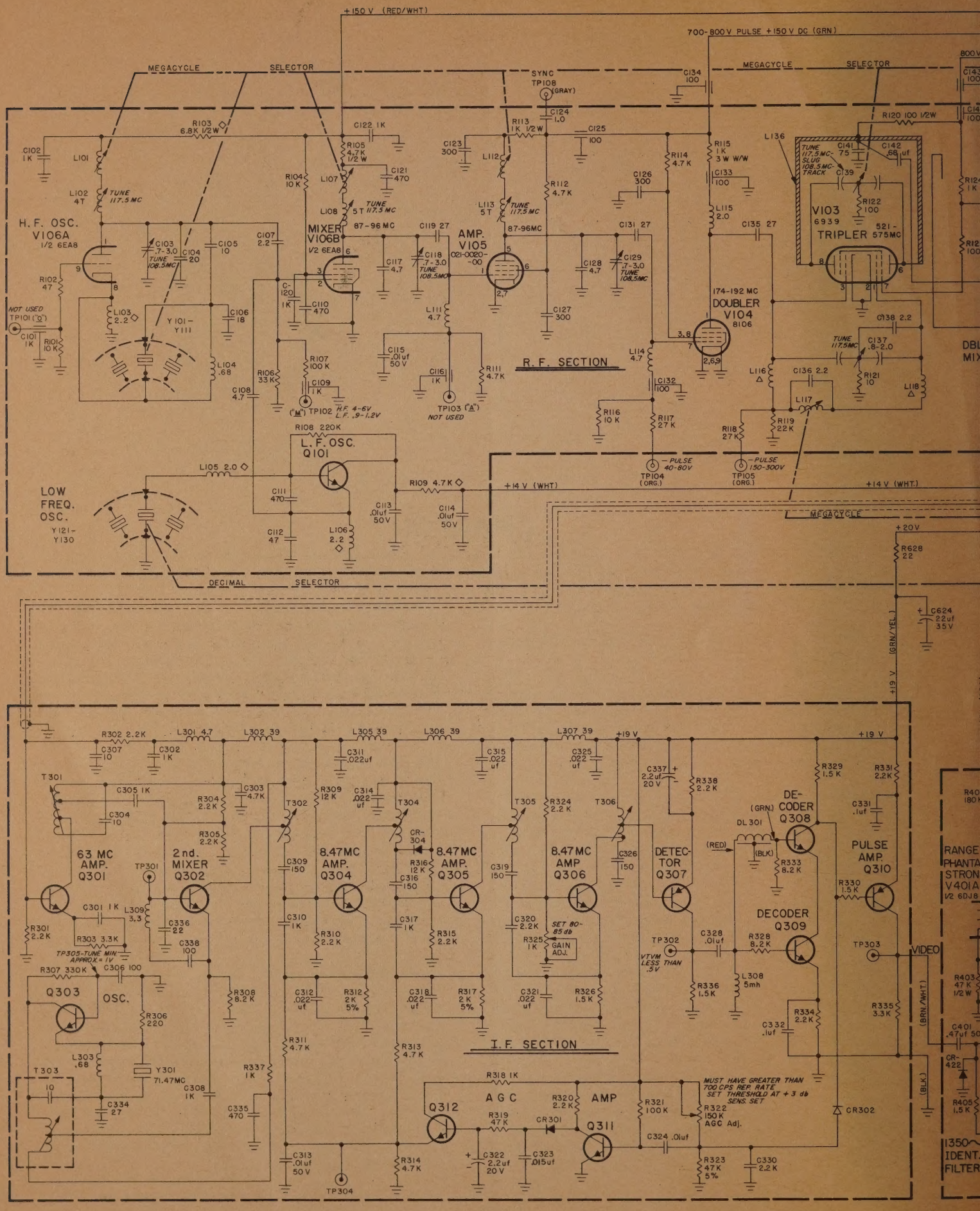
Check your current aeronautical chart for all available VOR/DME stations. Since the DME channels (978 Mc - 1213 Mc) are paired with VOR channels (108 Mc - 117 Mc), set the DME channel selector to the VOR frequency. The DME is now tuned to the correct UHF frequency and not actually operating on a VOR (VHF) frequency. The large outer knob on the right side is the megacycle selector and the small inner knob on the right side is the decimal selector.

In the center of the UHF DME frequency spectrum there is a small band of Transponder frequencies. The KN-60 channel selector automatically bypasses these frequencies by the use of two 112 megacycle positions. The decimal positions .0 through .2 operate with the first 112 Mc position, and the .3 through .9 positions operate with the second 112 Mc position. A mask on the megacycle selector knob will cover the decimal numeral when the wrong 112 Mc position has been selected and the unit will not function. Set the decimal selector knob first and then the megacycle selector knob to the 112 Mc position, that leaves the decimal numeral visable.

After the frequency selector has been set to the frequency of an operating DME facility within range, the indicator will stop searching as it reaches the correct aircraft station mileage indication. The ground facility may be identified by listening to their coded station identification. NOTE: An aircraft on the ground usually will not receive DME stations due to line of sight signal limitations.

The KN-60's Range selector (large knob on left side of the unit), when placed in the "HI" position, selects read-out of distances from 0 to 100 nautical miles in 5 mile increments. The "LO" position selects read-out of distances from 0 to 20 nautical miles in 1 mile increments. Tracking speeds between 50 and 250 knots in 10 knot increments may be read by selecting the "KT" position on the Range/Speed selector. In switching between the "HI" and "LO" positions, time must be allowed for unit to search and relock on the station.

If the DME reply signal should be momentarily interrupted, the KN-60 indicator will continue tracking during memory hold. This memory hold of 8 to 12 seconds is incorporated to prevent searching should the reply be temporarily interrupted by banking of the aircraft or signal fading. Longer interruptions will cause the indicator to again search until sufficient signal strength is detected to produce a new lock-on. DME transmissions are in the UHF spectrum and are greatly affected by any object that interfers with the line of sight between the ground facility and the aircraft.


+150 V (RED/WHT)
700-800 V PULSE +150 V DC (GRN)
MEGACYCLE SELECTOR
SYNC TP108 (GRAY)
H.F. OSC. V106A 1/2 6EA8
MIXER V106B 1/2 6EA8
87-96 MC
AMP. V105 021-0020-00
87-96MC
V103 6939 TRIPLER 521-575MC
174-192 MC DOUBLER V104 8106
R.F. SECTION
L.F. OSC. Q101
LOW FREQ. OSC. Y121-Y130
DECIMAL SELECTOR
+14 V (WHT)
+20V
+19 V (GRN/YEL)
63 MC AMP. Q301
2nd. MIXER Q302
8.47MC AMP. Q304
8.47MC AMP. Q305
8.47MC AMP Q306
DETECTOR Q307
DE-CODER Q308
PULSE AMP. Q310
DECODER Q309
Q303 OSC.
Y301 71.47MC
I.F. SECTION
AGC AMP Q311
Q312
VIDEO
TP301
TP302
TP303
TP304
CR302
CR301
L136
DL 301

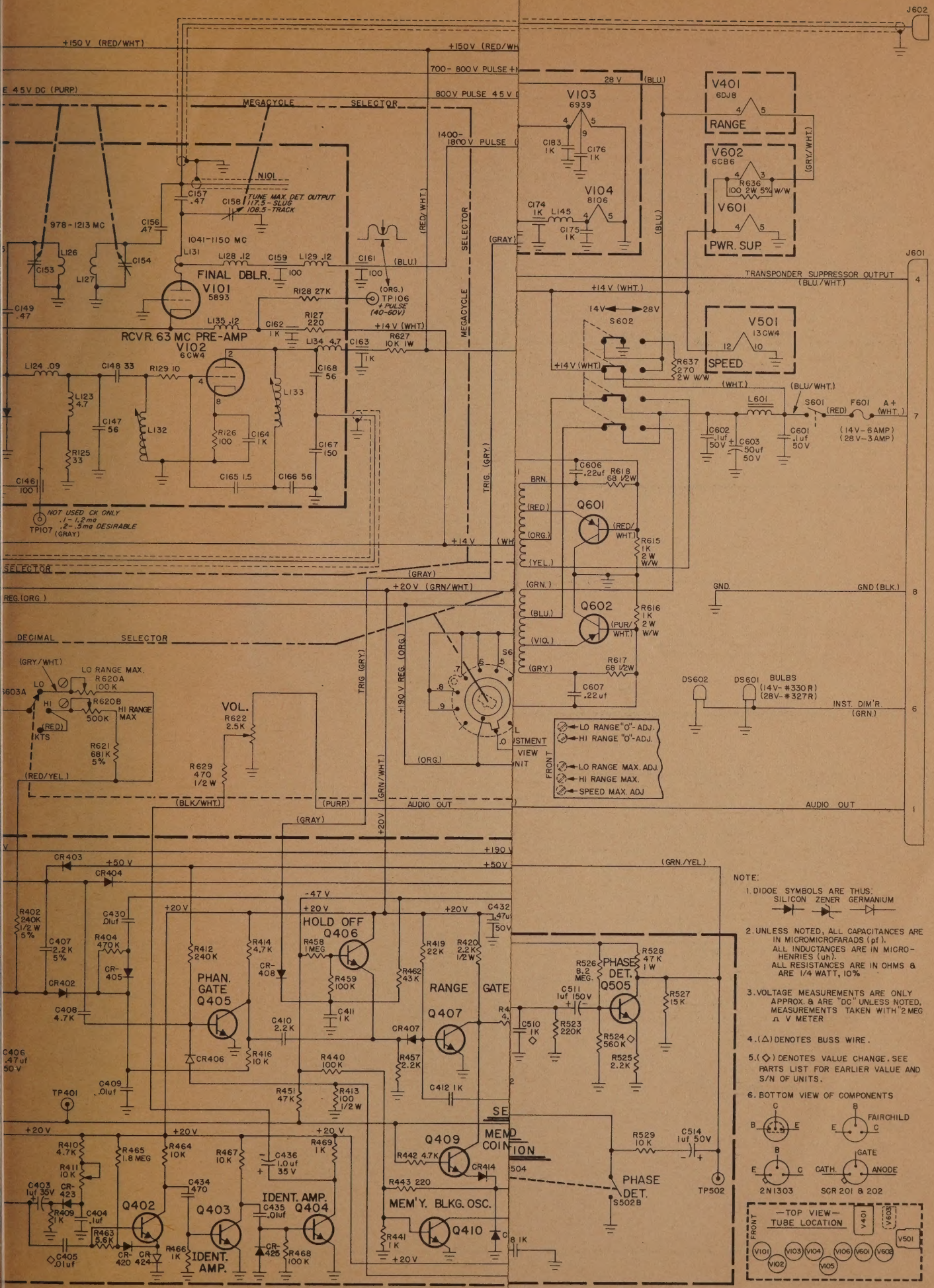
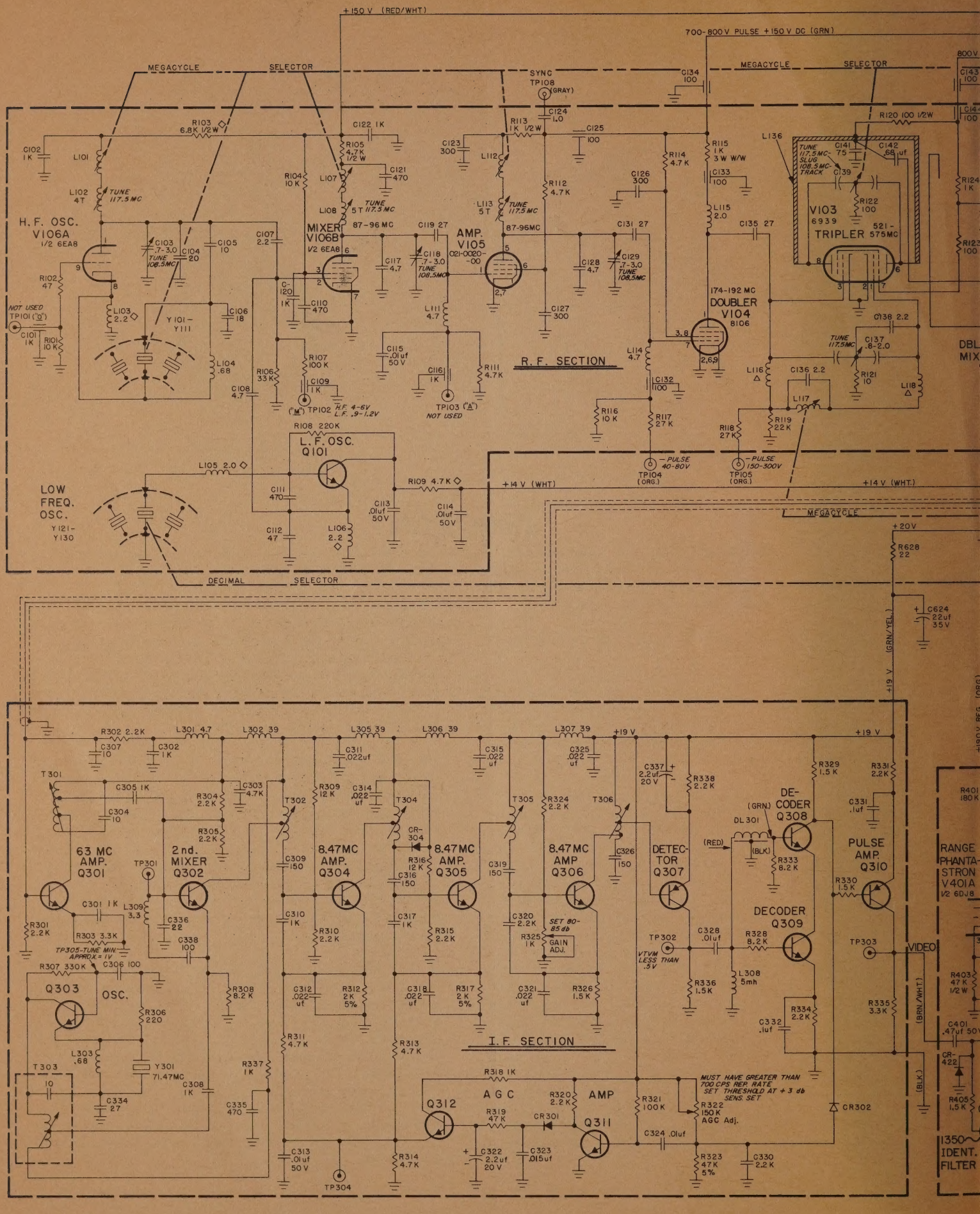


FIGURE-6 KN-60 DME SCHEMATIC REV.-1 6/5/64


+150 V (RED/WHT)
700-800 V PULSE +150 V DC (GRN)
MEGACYCLE SELECTOR
SYNC TP108 (GRAY)
H.F. OSC. V106A 1/2 6EA8
MIXER V106B 1/2 6EA8
87-96 MC
AMP. V105 6211-0020-00
87-96MC
V103 6939 521-TRIPLER 575MC
174-192 MC DOUBLER V104 8106
R.F. SECTION
L.F. OSC. Q101
LOW FREQ. OSC. Y121-Y130
NOT USED TP101 ("G")
TP102 ("M") R.F. 4-6V L.F. .9-1.2V
TP103 ("A") NOT USED
TP104 (ORG.) -PULSE 40-80V
TP105 (ORG.) -PULSE 150-300V
+14 V (WHT)
+20V
+19 V (GRN/YEL)
DECIMAL SELECTOR
63 MC AMP. Q301
2nd. MIXER Q302
8.47MC AMP. Q304
8.47MC AMP. Q305
8.47MC AMP Q306
DETEC-TOR Q307
DE-CODER Q308
PULSE AMP. Q310
DECODER Q309
Q303 OSC.
Q312 AGC AMP
Q311
I.F. SECTION
TP301
TP302
TP303
TP304
TP305-TUNE MIN APPROX = 1V
VTVM LESS THAN .5V
SET 80-85 db GAIN ADJ.
MUST HAVE GREATER THAN 700 CPS REP. RATE SET THRESHOLD AT +3 db SENS. SET
R322 150K AGC Adj.
VIDEO
RANGE PHANTASTRON V401A 1/2 6DJ8
1350~ IDENT. FILTER

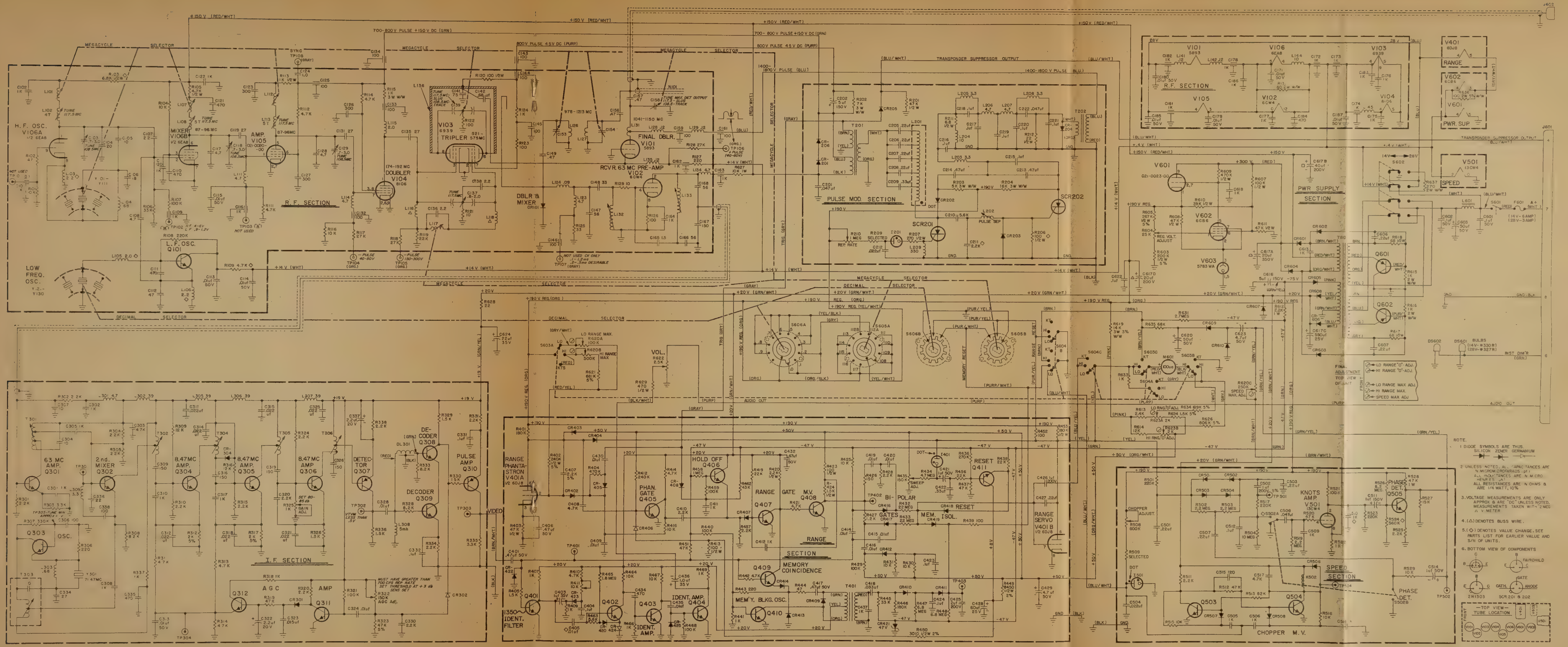
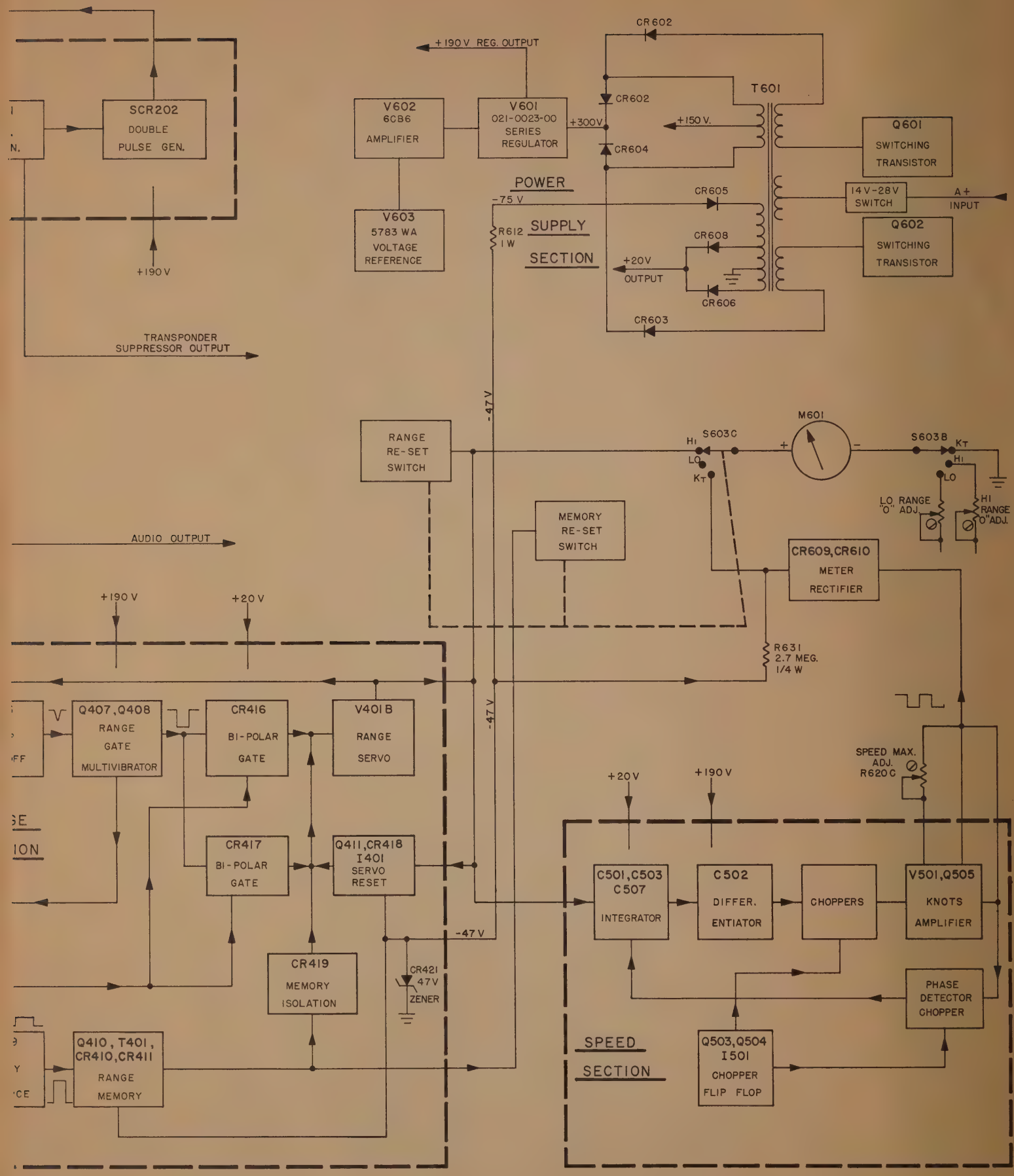

R.F. SECTION
H.F. OSC. V106A 1/2 6EA8
MIXER V106B 1/2 6EA8
AMP. V105
DOUBLER V104 8106
V103 6939 TRIPLER
DBLR & MIXER CR101
FINAL DBLR. V101 5893
RCVR. 63 MC PRE-AMP V102 6CW4
L.F. OSC. Q101
LOW FREQ. OSC.
MEGACYCLE SELECTOR
DECIMAL SELECTOR
PULSE MOD. SECTION
SCR201
SCR202
TRANSPONDER SUPPRESSOR OUTPUT
PWR SUPPLY SECTION
V601
V602 6CB6
V603 5783 WA
Q601
Q602
I.F. SECTION
63 MC AMP. Q301
2nd. MIXER Q302
OSC. Q303
8.47MC AMP. Q304
8.47MC AMP. Q305
8.47MC AMP Q306
DETECTOR Q307
DECODER Q308
DECODER Q309
PULSE AMP Q310
AGC Q312
AMP Q311
RANGE PHANTASTRON V401A 1/2 6DJ8
1350 IDENT. FILTER
Q401
Q402
Q403
IDENT. AMP. Q404
PHAN. GATE Q405
HOLD OFF Q406
RANGE GATE M.V. Q407 Q408
RANGE SECTION
BI-POLAR GATES
MEM. ISOL.
RESET Q411
MEMORY COINCIDENCE Q409
MEM'Y. BLKG. OSC. Q410
RANGE SERVO V401B 1/2 6DJ8
SPEED SECTION
KNOTS AMP. V501 13CW4
PHASE DET. Q505
CHOPPER M.V.
Q503
Q504
FINAL ADJUSTMENT TOP VIEW OF UNIT
LO RANGE "0" ADJ.
HI RANGE "0" ADJ.
LO RANGE MAX ADJ.
HI RANGE MAX.
SPEED MAX ADJ.
NOTE.
1. DIODE SYMBOLS ARE THUS. SILICON ZENER GERMANIUM
2. UNLESS NOTED, ALL CAPACITANCES ARE IN MICROMICROFARADS (pf). ALL INDUCTANCES ARE IN MICROHENRIES (uh). ALL RESISTANCES ARE IN OHMS & ARE 1/4 WATT, 10%
3. VOLTAGE MEASUREMENTS ARE ONLY APPROX. & ARE "DC" UNLESS NOTED. MEASUREMENTS TAKEN WITH 2 MEG Ω V METER
4. (△) DENOTES BUSS WIRE.
5. (◇) DENOTES VALUE CHANGE. SEE PARTS LIST FOR EARLIER VALUE AND S/N OF UNITS.
6. BOTTOM VIEW OF COMPONENTS
2N1303
SCR 201 & 202
FAIRCHILD
—TOP VIEW— TUBE LOCATION

FIGURE-6 KN-60 DME SCHEMATIC REV.-1 6/5/64



: BLOCK DIAGRAM

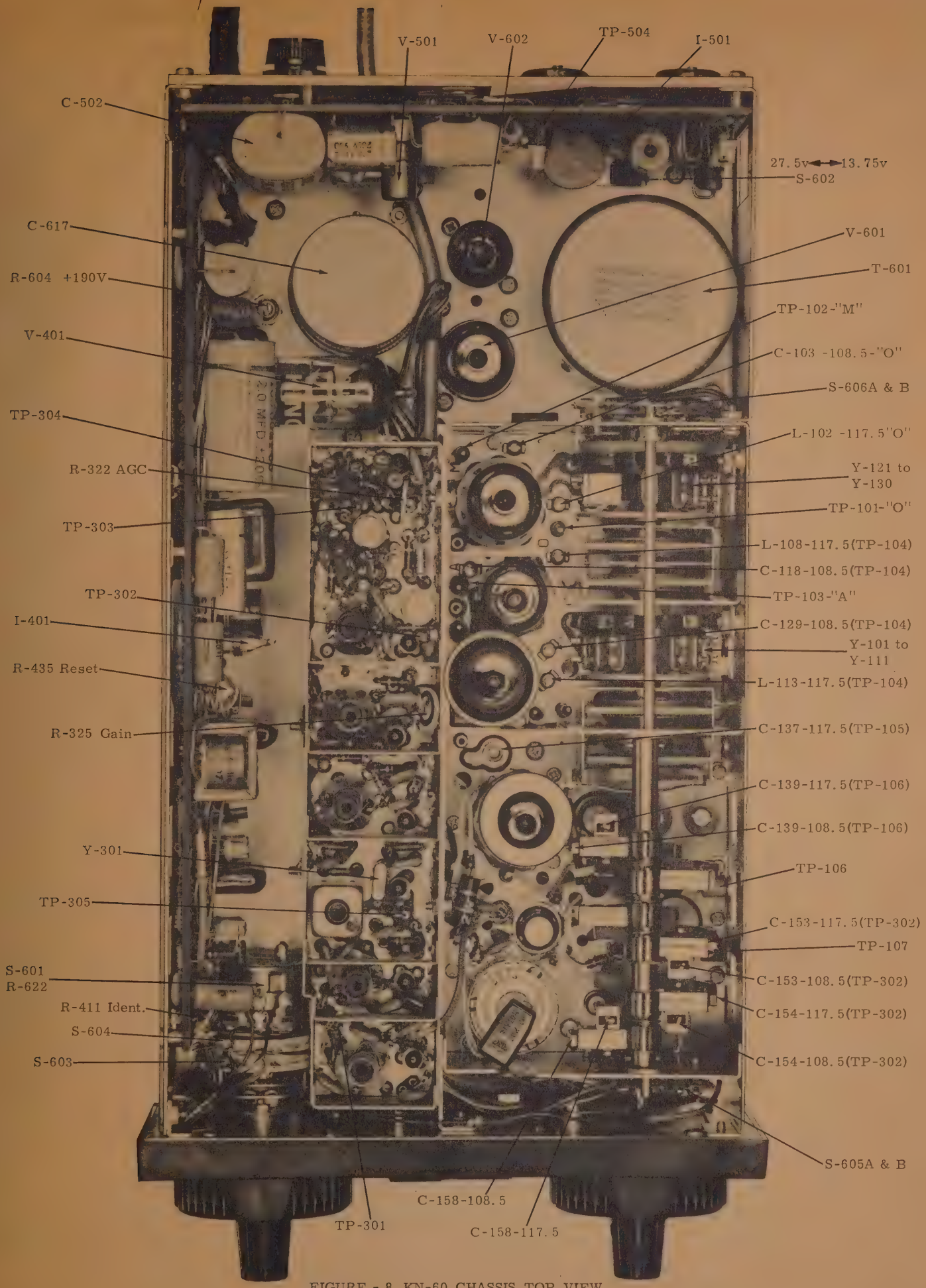


FIGURE - 8 KN-60 CHASSIS TOP VIEW

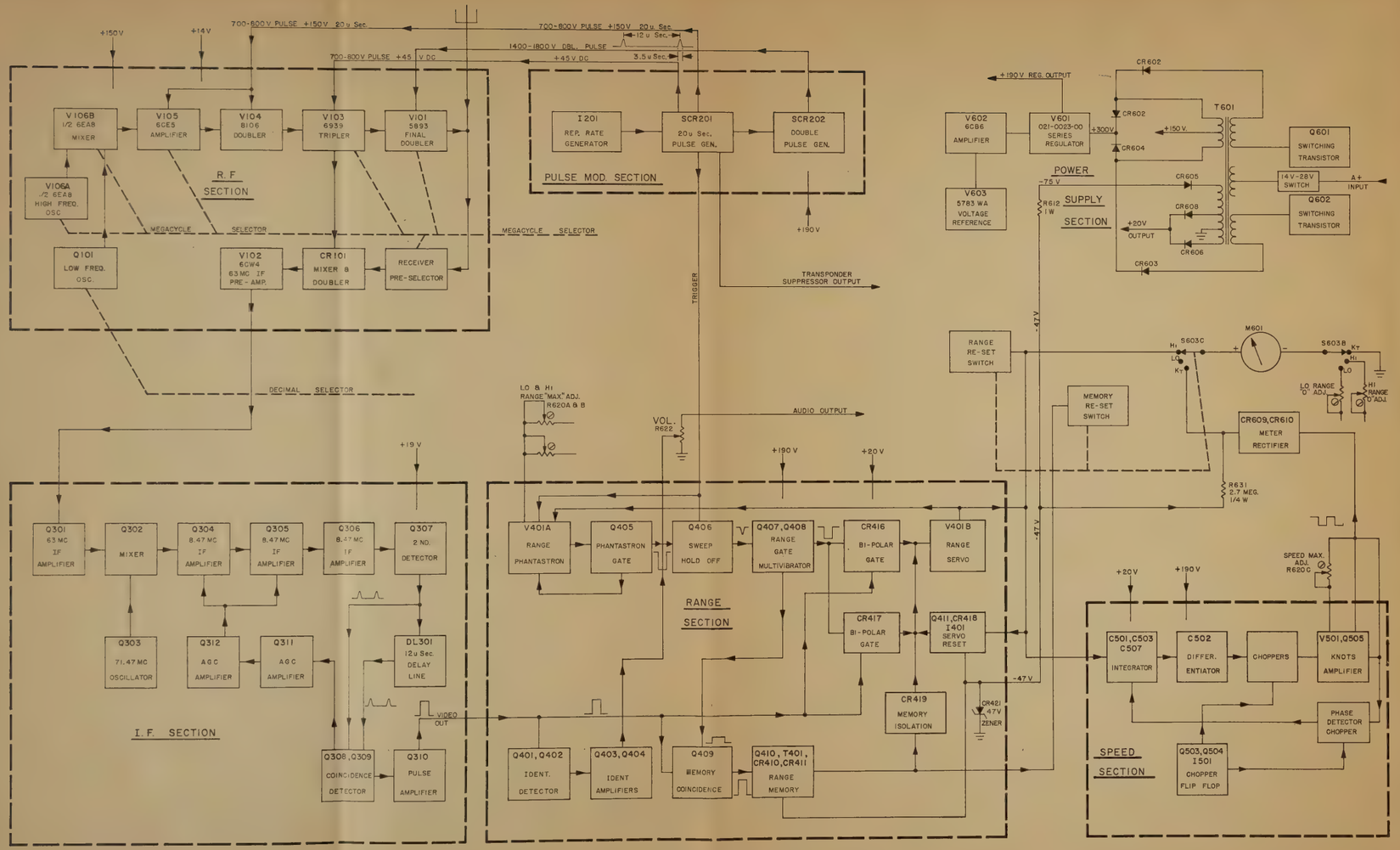


FIGURE - 7 KN-60 DME BLOCK DIAGRAM

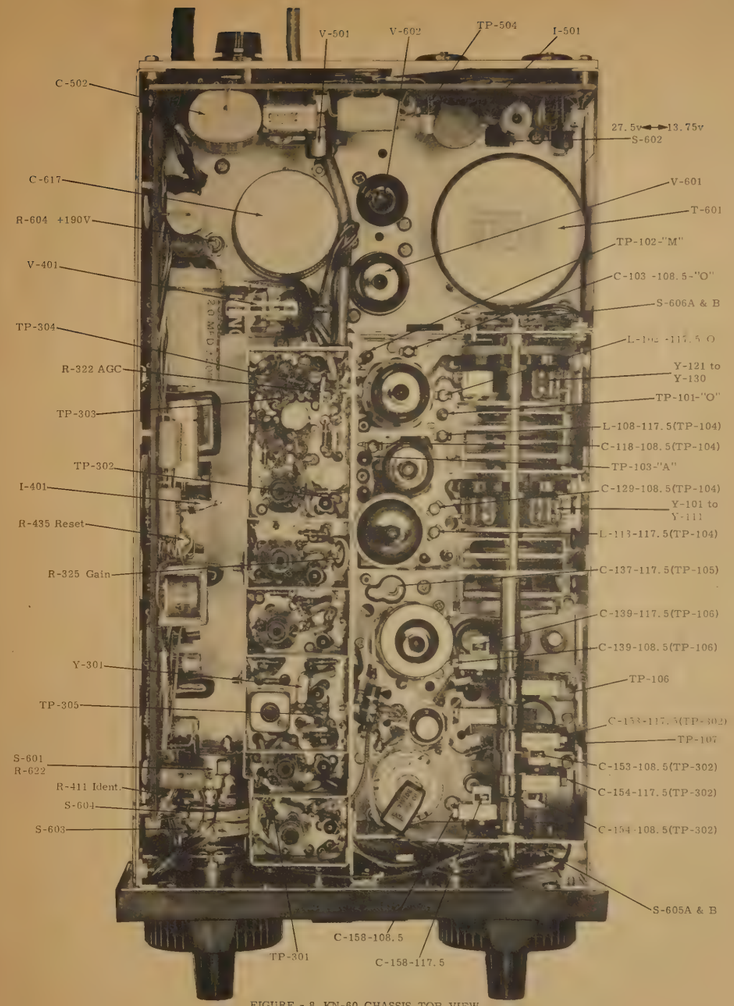


FIGURE - 8 KN-60 CHASSIS TOP VIEW

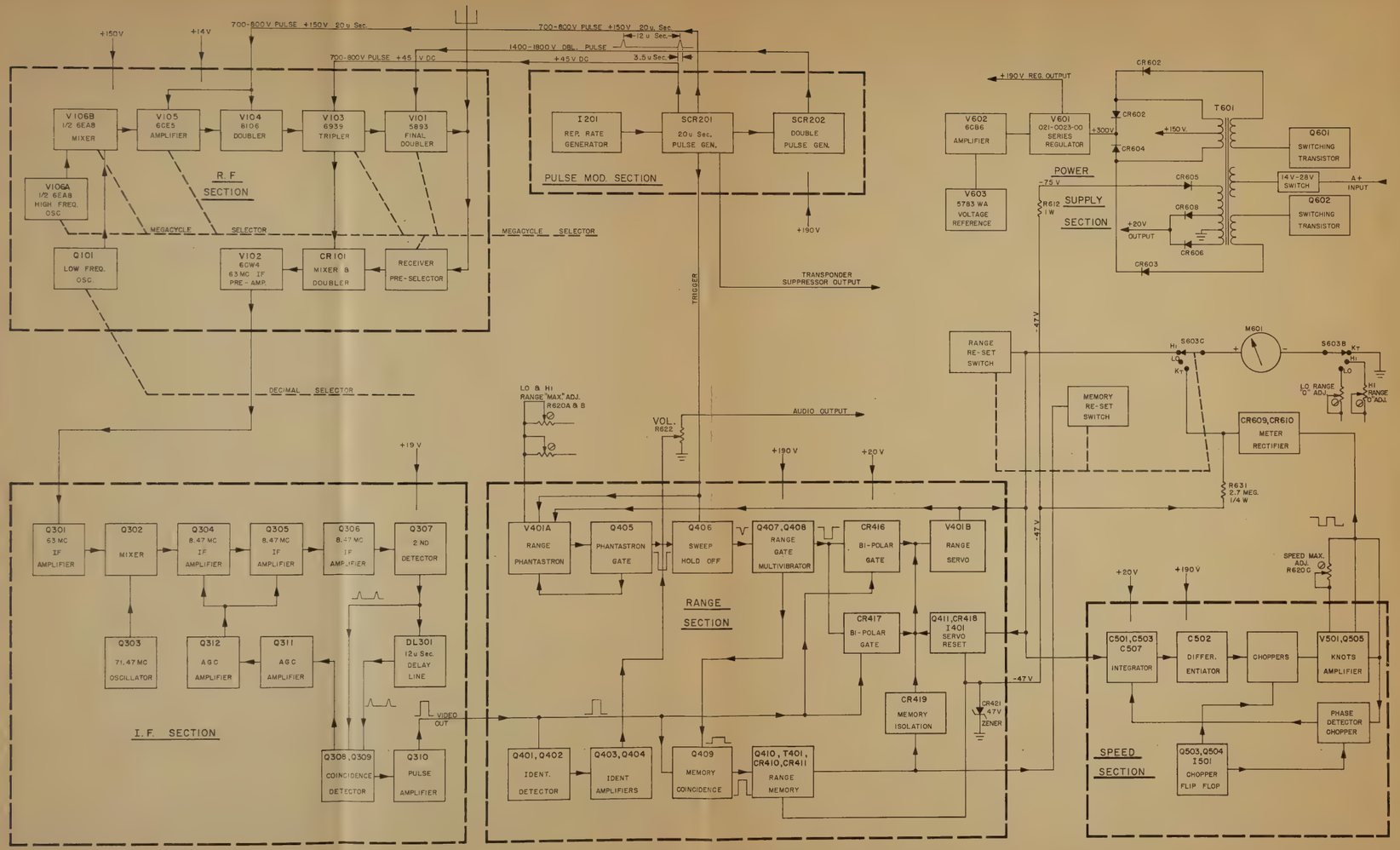


FIGURE - 7 KN-60 DME BLOCK DIAGRAM

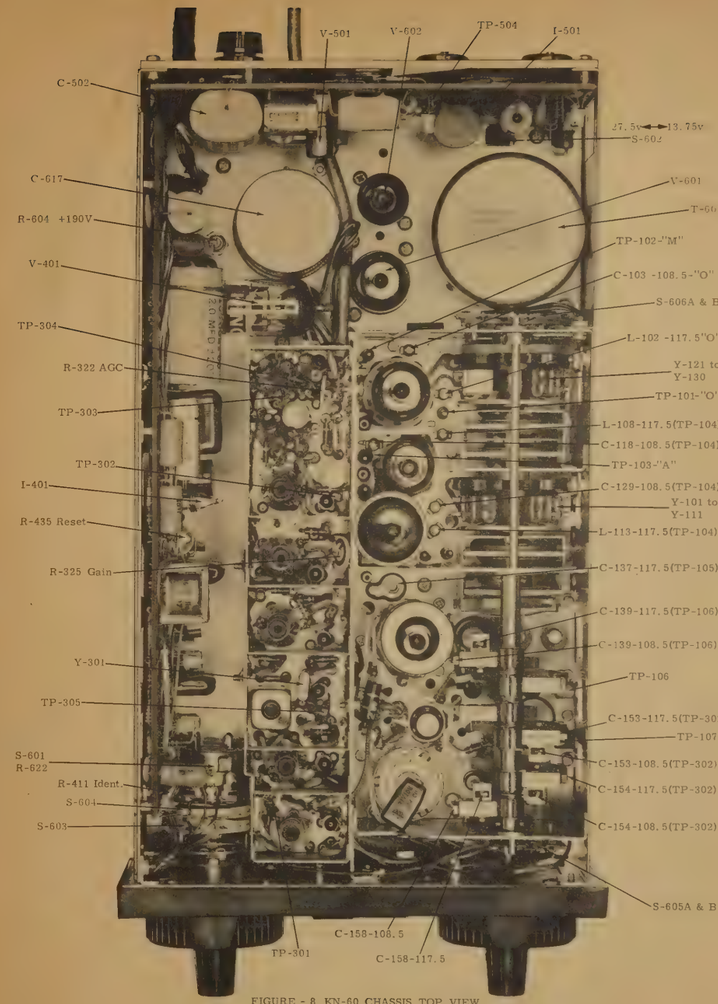


FIGURE - 8 KN-60 CHASSIS TOP VIEW

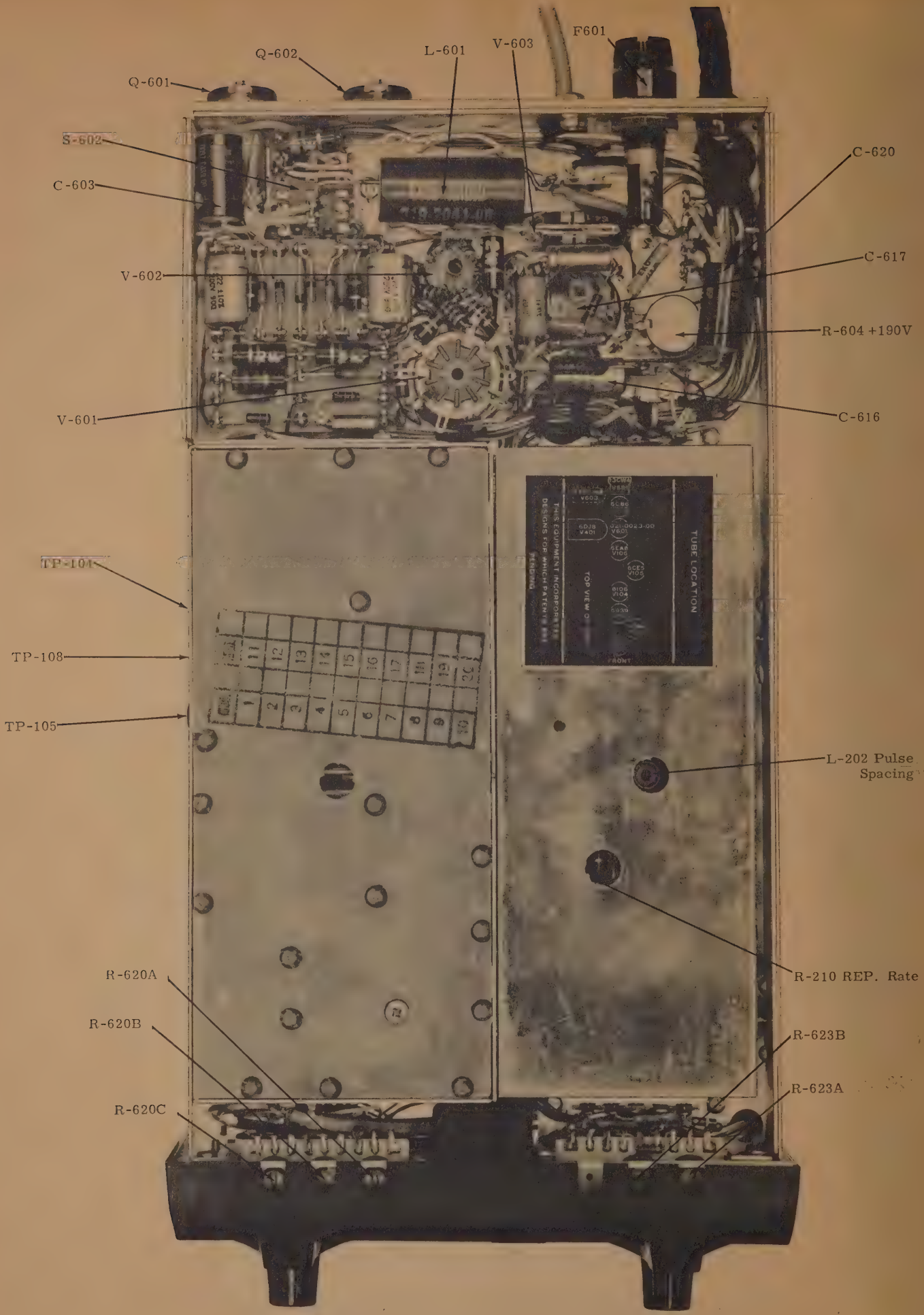


FIGURE - 9 KN-60 CHASSIS BOTTOM VIEW

INCLUDE SYMBOL NUMBER, KING PART NUMBER AND MODEL NUMBER WITH YOUR ORDER.

KN-60 PARTIAL PARTS LIST

RF CIRCUIT BOARD

SYMBOL NO.	DESCRIPTION	PART NO.
C-102, 120, 186	Cap., Ceramic, 1Kpf	113-5102-00
C-103, 118, 129	Cap., Trim., .7-3.0pf	102-0010-01
C-104	Cap., Ceramic, 20pf	113-3200-00
C-105	Cap., Ceramic, 10pf	113-3100-00
C-106	Cap., Ceramic, 18pf	113-3180-00
C-107, 136, 138	Cap., Ceramic, 2.2pf	113-5022-00
C-108, 117, 128	Cap., Ceramic, 4.7pf	113-3047-00
C-110, 111, 121, 184	Cap., Ceramic, 470pf	113-7471-00
C-112	Cap., Ceramic, 47pf	113-3470-00
C-113, 114, 115, 171, 179, 180, 185, 187	Cap., Ceramic, .01uf	113-6103-00
C-119, 131, 135	Cap., Ceramic, 27pf	113-3270-00
C-122, 164, 175, 176, 177, 183	Cap., Ceramic, 1Kpf	113-8102-00
C-123, 126, 127	Cap., Ceramic, 300pf	113-5301-00
C-124	Cap., Molded, 1.0pf	106-0001-01
C-137	Cap., Glass, .8-2.0pf	102-0012-00
C-139	Cap., Glass, Split	102-0014-00
C-142	Cap., Molded, .68pf	106-0001-08
C-145	Cap., Ceramic, 100pf	113-3101-00
C-147, 166, 168	Cap., Ceramic, 56pf	114-3560-00
C-148	Cap., Ceramic, 33pf	113-3330-00
C-149, 156, 157	Cap., Molded, .47pf	106-0001-00
C-165	Cap., Molded, 1.5pf	106-0001-02
C-167	Cap., Ceramic, 150pf	113-3151-00
CR-101	Diode, Silicon, Pt.,Con.	007-6017-00
L-103, 106	Choke, 2.2uh	019-2055-20
L-104	Choke, .68uh	019-2055-14
L-105, 115, 145	Choke, 2.0uh	019-2062-00
L-111, 114	Choke, 4.7uh	019-2058-20
L-123, 134	Choke, 4.7uh	019-2055-24
L-124	Choke, .09uh	019-2017-00
L-128, 129, 135, 141, 142	Choke, .12uh	019-2055-05
L-144	Choke, 10.0uh	019-2058-24
Q-101	Transistor	007-0021-00
R-101, 104, 116	Resistor, 10KΩ, 1/4w	130-0103-25
R-102	Resistor, 47Ω, 1/4w	130-0470-25
R-103	Resistor, 6.8KΩ, 1/2w	130-0682-35
R-105	Resistor, 4.7KΩ, 1/2w	130-0472-35
R-106	Resistor, 33KΩ, 1/4w	130-0333-25
R-107	Resistor, 100KΩ, 1/4w	130-0104-25
R-108	Resistor, 220KΩ, 1/4w	130-0224-25
R-109, 111, 112, 114	Resistor, 4.7KΩ, 1/4w	130-0472-25
R-113	Resistor, 1KΩ, 1/2w	130-0102-35
R-115	Resistor, W/W, 1KΩ, 3w	132-0016-00
R-117, 118, 128	Resistor, 27KΩ, 1/4w	130-0273-25
R-119	Resistor, 22KΩ, 1/4w	130-0223-25
R-120	Resistor, 100Ω, 1/2w	130-0101-35
R-121, 129	Resistor, 10Ω, 1/4w	130-0100-25
R-122, 123, 126	Resistor, 100Ω, 1/4w	130-0101-25
R-124	Resistor, 1KΩ, 1/4w	130-0102-25
R-125	Resistor, 33Ω, 1/4w	130-0330-25
R-127	Resistor, 220Ω, 1/4w	130-0221-25
R-131	Resistor, W/W, 180Ω, 2w	132-5001-00
V-101	Electron Tube, 5893	021-0022-00
V-102	Electron Tube, 6CW4	021-0012-00
V-103	Electron Tube, 6939	021-0021-00
V-104	Electron Tube, 8106	021-0016-00
V-105	Electron Tube,SELECT	021-0020-00
V-106	Electron Tube, 6EA8	021-0013-00
Y-101	Crystal, 66.8017 Mc	041-8668-01
Y-102	Crystal, 67.6350 Mc	041-8676-35
Y-103	Crystal, 68.4683 Mc	041-8684-68
Y-104	Crystal, 69.3017 Mc	041-8693-01

RF CIRCUIT BOARD

SYMBOL NO.	DESCRIPTION	PART NO.
Y-105	Crystal, 70.1347 Mc	041-8701-34
Y-106	Crystal, 70.9683 Mc	041-8709-68
Y-107	Crystal, 71.8017 Mc	041-8718-01
Y-108	Crystal, 72.6350 Mc	041-8726-35
Y-109	Crystal, 73.4683 Mc	041-8734-68
Y-110	Crystal, 74.3017 Mc	041-8743-01
Y-111	Crystal, 75.1347 Mc	041-8751-34
Y-121	Crystal, 19.9483 Mc	041-8199-48
Y-122	Crystal, 20.0316 Mc	041-8200-31
Y-123	Crystal, 20.1149 Mc	041-8201-14
Y-124	Crystal, 20.1983 Mc	041-8201-98
Y-125	Crystal, 20.2816 Mc	041-8202-81
Y-126	Crystal, 20.3649 Mc	041-8203-64
Y-127	Crystal, 20.4483 Mc	041-8204-48
Y-128	Crystal, 20.5316 Mc	041-8205-31
Y-129	Crystal, 20.6149 Mc	041-8206-14
Y-130	Crystal, 20.6983 Mc	041-8206-98

PULSE MOD. BOARD

C-201, 222	Cap., Mylar, .047uf	105-0022-00
C-202	Cap., Electro., 5uf	097-0035-00
C-205, 206, 207, 208	Cap., Mylar, .22uf	105-0022-02
C-209	Cap., Mylar, .33uf	105-0022-03
C-210	Cap., Mylar, 5.6Kpf	105-0018-41
C-211	Cap., Mylar, 2.2Kpf	105-0018-27
C-212	Cap., Mylar, .022uf	105-0018-62
C-213, 214	Cap., Mylar, .47uf	105-0022-04
C-215, 216, 217, 218, 219, 220, 221	Cap., Mylar, .1uf	105-0022-01
CR-201,202, 203, 204, 205, 206	Diode, Silicon	007-6006-00
I-201	Bulb, Neon	037-0005-01
L-203, 205, 208,	Choke, 3.3uh	019-2049-00
L-204	Choke, 10.0uh	019-2058-24
L-206, 207	Choke, 4.7uh	019-2050-00
L-209	Choke, 330uh	019-2053-00
R-201	Resistor, 47KΩ, 1/2w	130-0473-35
R-202	Resistor, W/W, 7KΩ, 3w	132-0018-00
R-203	Resistor, 5KΩ, 3w	132-0013-00
R-204	Resistor, 16KΩ, 3w	132-0017-00
R-206	Resistor, 1KΩ, 1/2w	130-0102-35
R-207	Resistor, 270Ω, 1/2w	130-0271-35
R-209	Resistor, SELECTED	
R-210	Resistor, 1MΩ, 1/10w	133-0016-04
R-211	Resistor, 6.8Ω, 1/2w	130-0068-35
R-212	Resistor, 22Ω, 1/2w	130-0220-35
SCR-201, 202	Rectifier, Silicon Cont.	007-6018-00
T-201	Xfmr., Driver	019-6005-00
T-202	Xfmr., Final Pulse	019-6006-00

IF CIRCUIT BOARD

C-301, 302, 305, 308, 310, 317	Cap., Ceramic, 1Kpf	113-5102-00
C-303	Cap., Ceramic, 4.7Kpf	114-6472-00
C-304, 307	Cap., Ceramic, 10pf	113-3100-00
C-306, 338	Cap., Ceramic, 100pf	113-3101-00
C-309, 316, 319, 326	Cap., Ceramic, 150pf	113-3151-00
C-311, 312, 314, 315, 318, 321, 325	Cap., Mylar, .022uf	105-0018-62
C-313	Cap., Ceramic, .01uf	113-6103-00
C-320, 330	Cap., Ceramic, 2.2Kpf	114-7222-00
C-322, 337	Cap., Tant., 2.2uf	096-4003-00
C-323	Cap., Mylar, .015uf	105-0018-56
C-324	Cap., Mylar, .01uf	105-0018-50
C-328	Cap., Ceramic, .01uf	115-7103-00
C-331, 332	Cap., Mylar, .1uf	105-0022-01

INCLUDE SYMBOL NUMBER, KING PART NUMBER AND MODEL NUMBER WITH YOUR ORDER.

KN-60 PARTIAL PARTS LIST

IF CIRCUIT BOARD

SYMBOL NO.	DESCRIPTION	PART NO.
C-334	Cap., Ceramic, 27pf	113-3270-00
C-335	Cap., Ceramic, 470pf	113-7471-00
C-336	Cap., Ceramic, 22pf	113-3220-00
CR-301	Diode, Silicon	007-6007-00
CR-302	Diode, Germanium	007-6009-00
CR-304	Diode, Silicon Pt. Con.	007-6017-00
DL-301	Delay Line - 12u Sec.	019-6003-00
L-301	Choke, RF 4.7uh	019-2055-24
L-302, 305, 306, 307	Choke, RF 39uh	019-2058-34
L-303	Choke, RF .68uh	019-2055-14
L-308	Choke, RF 5mh	019-2048-00
L-309	Choke, RF 3.3uh	019-2049-00
Q-301, 302, 303, 304, 305, 306	Transistor, Silicon	007-0021-00
Q-307, 310	Transistor, Silicon	007-0023-00
Q-308, 309	Transistor, Silicon	007-0026-00
Q-311, 312	Transistor, Silicon	007-0025-00
R-301, 302, 304, 310, 315, 320, 324, 331, 334, 338	Resistor, 2.2KΩ, 1/4w	130-0222-25
R-303, 335	Resistor, 3.3KΩ, 1/4w	130-0332-25
R-305	Resistor, 18KΩ, 1/4w	130-0183-25
R-306	Resistor, 220Ω, 1/4w	130-0221-25
R-307	Resistor, 330KΩ, 1/4w	130-0334-25
R-308, 328, 333	Resistor, 8.2KΩ, 1/4w	130-0822-25
R-309, 316	Resistor, 12KΩ, 1/4w	130-0123-25
R-311, 313, 314, 327	Resistor, 4.7KΩ, 1/4w	130-0472-25
R-312, 317	Resistor, 2KΩ, 1/4w	130-0202-23
R-318, 337	Resistor, 1KΩ, 1/4w	130-0102-25
R-319	Resistor, 47KΩ, 1/4w	130-0473-25
R-321	Resistor, 100KΩ, 1/4w	130-0104-25
R-322	Resistor, 150KΩ, 1/10w	133-0016-00
R-323	Resistor, 47KΩ, 1/4w	130-0473-23
R-325	Resistor, 1KΩ, 1/10w	133-0016-02
R-326, 329, 330, 336	Resistor, 1.5KΩ, 1/4w	130-0152-25
T-301	IF Coil	019-8015-00
T-302, 304, 305	IF Coil	019-8016-00
T-306	IF Coil	019-8017-00
Y-301	Crystal, 71.4700 Mc	045-1002-00

RANGE BOARD

C-401, 406, 417 432	Cap., Mylar, .47uf	105-0019-00
C-403, 436	Cap., Tant., 1uf	096-4001-00
C-404, 423, 424	Cap., Mylar, .1uf	105-0018-86
C-405, 414, 415, 416, 420, 435	Cap., Mylar, .01uf	105-0018-50
C-407	Cap., Mylar, 2.2Kpf	105-0018-27
C-408	Cap., Mylar, 4.7Kpf	105-0018-38
C-409, 419, 430	Cap., Ceramic, .01uf	115-7103-00
C-410	Cap., Ceramic, 2.2Kpf	114-7222-00
C-411, 437	Cap., Ceramic, 1Kpf	113-5102-00
C-412	Cap., Mylar, 1Kpf	105-0018-14
C-418	Cap., Mylar, .033uf	105-0018-68
C-421	Cap., Tant., 1uf	096-4002-00
C-422	Cap., Mylar, .33uf	105-0022-03
C-425	Cap., Mylar, 2uf	105-0021-00
C-426	Cap., Mylar, 1uf	105-0020-00
C-427	Cap., Mylar, .22uf	105-0022-05
C-428	Cap., Electro., 60uf	097-0036-00
C-429	Cap., Tant., 4.7uf	096-1010-00
C-434	Cap., Ceramic, 470pf	113-7471-00
CR-402, 405, 407	Diode, Silicon	007-6008-00

RANGE BOARD

SYMBOL NO.	DESCRIPTION	PART NO.
CR-408, 409, 410, 411, 413, 414, 420, 422, 425	Diode, Silicon	007-6008-00
CR-403, 404	Diode, Silicon	007-6020-00
CR-406, 424	Diode, Germanium	007-6009-00
CR-412, 423	Diode, Silicon	007-6015-00
CR-416, 417, 418, 419	Diode, Silicon Spl.	007-6019-00
CR-421	Diode, Zener, 47V	007-5001-00
I-401	Neon Lamp	037-0008-00
Q-401, 402, 403, 404, 410	Transistor	007-0026-00
Q-405, 409, 411	Transistor	007-0025-00
Q-406	Transistor	007-0021-00
Q-407	Transistor	007-0026-02
Q-408	Transistor	007-0026-03
R-401, 446	Resistor, 180KΩ, 1/4w	130-0184-25
R-402	Resistor, 240KΩ, 1/2w	131-2403-13
R-403	Resistor, 47KΩ, 1/2w	130-0473-35
R-404	Resistor, 470KΩ, 1/4w	130-0474-25
R-405	Resistor, 1.5KΩ, 1/4w	130-0152-25
R-407, 409, 441, R 466, 469	Resistor, 1KΩ, 1/4w	130-0102-25
R-410, 414, 421, 442	Resistor, 4.7KΩ, 1/4w	130-0472-25
R-411	Resistor, 10KΩ, 1/10w	133-0016-03
R-412	Resistor, 240KΩ, 1/4w	130-0244-23
R-413, 423	Resistor, 100Ω, 1/2w	130-0101-35
R-416, 425, 430, 431, 464, 467	Resistor, 10KΩ, 1/4w	130-0103-25
R-419, 438, 456,	Resistor, 22KΩ, 1/4w	130-0223-25
R-420	Resistor, 2.2KΩ, 1/2w	130-0222-35
R-424	Resistor, 1.5KΩ, 1/2w	130-0152-35
R-426	Resistor, 150Ω, 1/4w	130-0151-25
R-427	Resistor, 1.2KΩ, 1/4w	130-0122-25
R-428, 457	Resistor, 2.2KΩ, 1/4w	130-0222-25
R-429, 440, 459, 468	Resistor, 100KΩ, 1/4w	130-0104-25
R-432, 433	Resistor, 22MΩ, 1/4w	130-0226-25
R-434	Resistor, 4.7MΩ, 1/4w	130-0475-25
R-435	Resistor, 150KΩ, 1/10w	133-0016-00
R-436	Resistor, 2.70KΩ, 1/4w	130-0274-25
R-437, 451	Resistor, 47KΩ, 1/4w	130-0473-25
R-439, 452	Resistor, 100Ω, 1/4w	130-0101-25
R-443	Resistor, 220Ω, 1/4w	130-0221-25
R-444	Resistor, 47Ω, 1/4w	130-0470-25
R-445	Resistor, 33KΩ, 1/4w	130-0333-25
R-447, 448	Resistor, 6.8MΩ, 1/4w	130-0685-25
R-449	Resistor, PRECISION	131-8451-12
R-450	Resistor, PRECISION	131-3011-12
R-453	Resistor, 180KΩ, 1/2w	130-0184-35
R-458	Resistor, 1MΩ, 1/4w	130-0105-25
R-462	Resistor, 43KΩ, 1/4w	130-0433-23
R-463	Resistor, 5.6KΩ, 1/4w	130-0562-25
R-465	Resistor, 1.8MΩ, 1/4w	130-0185-25
T-401	Xfmr., Pulse Memory	019-6002-00
V-401	Electron Tube, 6DJ8	021-0026-00

SPEED BOARD

C-501, 503, 507	Cap., Mylar, .22uf	105-0022-02
C-502	Cap., Special, 1uf	108-0001-00
C-504	Cap., Mylar, .022uf	105-0018-62
C-505, 506, 510 518	Cap., Ceramic. 1Kpf	113-5102-00
C-508	Cap., Mylar, .047uf	105-0018-74
C-509	Cap., Mylar, 1Kpf	105-0018-14
C-511	Cap., Tant., 1uf	096-3001-00

INCLUDE SYMBOL NUMBER, KING PART NUMBER AND MODEL NUMBER WITH YOUR ORDER.

KN-60 PARTIAL PARTS LIST

SPEED BOARD

SYMBOL NO.	DESCRIPTION	PART NO.
C-512	Cap., Mylar, .1uf	105-0018-86
C-514	Cap., Tant., 1.0uf	096-4002-00
C-515	Cap., Ceramic, 120pf	113-3121-00
C-517	Cap., Ceramic, 4.7Kpf	114-6472-00
CR-501, 502, 503, 504, 506, 507, 508	Diode, Silicon	007-6008-00
I-501	Bulb, Neon	037-0008-00
K-502	Coil, Relay (Dbl. Reed)	019-2052-00
S-502A	Switch, Mag. Reed	031-0042-00
S-502B	Switch, Mag. Reed	031-0042-00
Q-503, 504	Transistor, Silicon	007-0026-00
Q-505	Transistor, Silicon	007-0026-03
R-501, 517, 523	Resistor, 220KΩ, 1/4w	130-0224-25
R-502, 503, 519	Resistor, 2.2MΩ, 1/4w	130-0225-25
R-504	Resistor, 10MΩ, 1/4w	130-0106-25
R-508	Resistor, 600KΩ, 1/10w	133-0016-01
R-509	Resistor, SELECTED	
R-511, 525	Resistor, 2.2KΩ, 1/4w	130-0222-25
R-512, 520	Resistor, 47KΩ, 1/4w	130-0473-25
R-513	Resistor, 82KΩ, 1/4w	130-0823-25
R-515, 516, 529	Resistor, 10KΩ, 1/4w	130-0103-25
R-521	Resistor, 100KΩ, 1/4w	130-0104-25
R-522	Resistor, 1KΩ, 1/4w	130-0102-25
R-524	Resistor, 560KΩ, 1/4w	130-0564-25
R-526	Resistor, 8.2MΩ, 1/4w	130-0825-25
R-527	Resistor, 15KΩ, 1/4w	130-0153-25
R-528	Resistor, 47KΩ, 1w	130-0473-45
V-501	Electron Tube, 13CW4	021-0018-00

POWER SUPPLY

C-601, 602	Cap., Ceramic, .1uf	117-6104-00
C-603, 620	Cap., Electro., 50uf	097-0039-00
C-606, 607	Cap., Mylar, .22uf	105-0022-02
C-613, 618	Cap., Ceramic, 1Kpf	113-8102-00
C-616	Cap., Electro., 5uf	097-0035-00
C-617	Cap., Electro., (4 Sect) (A) 20uf, (B) 40uf, (C) 550uf, (D) 20uf	097-0038-01
C-622	Cap., Mylar, .1uf	105-0018-86
C-623	Cap., Tant., 4.7uf	096-1010-00
C-624	Cap., Tant., 22uf	096-1011-00
CR-601, 602, 603, 604, 605, 606, 608	Diode, Silicon	007-6006-00
CR-607, 609, 610	Diode, Silicon	007-6008-00
DS-601, 602	Bulb, #327R, 28V	037-0007-04
DS-601, 602	Bulb, #330R, 14V	037-0007-03
F-601	Fuse, 6 Amp, 14V	036-0017-00
F-601	Fuse, 3 Amp, 28V	036-0018-00
L-601	Inductor, Hash Filter	019-2041-00
Q-601, 602	Transistor, Silicon	007-0004-00
R-603	Resistor, 200KΩ, 1/2w	131-2003-13
R-604	Resistor, 25KΩ, 1/4w	133-0017-00
R-605	Resistor, 267KΩ, 1/2w	131-2673-13
R-607	Resistor, 100KΩ, 1/2w	130-0104-35
R-608, 611	Resistor, 47KΩ, 1/2w	130-0473-35
R-609	Resistor, 470KΩ, 1/2w	130-0474-35
R-610	Resistor, 39KΩ, 1/2w	130-0393-35
R-612	Resistor, 2.2KΩ, 1w	130-0222-43
R-613	Resistor, 2.4KΩ, 1/4w	130-0242-23
R-614	Resistor, 12KΩ, 1/4w	130-0123-23
R-615, 616	Resistor, W/W, 1KΩ, 2w	132-5004-00
R-617, 618	Resistor, 68Ω, 1/2w	130-0680-35
R-619	Resistor, W/W, 14KΩ, 3w	132-0019-00
R-620	Resistor, Var. (3 Sect.) (A) 100KΩ, (B) 500KΩ, (C) 250KΩ	133-0018-01

POWER SUPPLY

SYMBOL NO.	DESCRIPTION	PART NO.
R-621	Resistor, 681KΩ, 1/4w	131-6813-23
R-622	Resistor, 2.5KΩ	See: S-601
R-623	Resistor, Var. (3 Sect.) (A)2KΩ (B)2KΩ (C)N/U	133-0018-00
R-624	Resistor, 1.5K, 1/4w	130-0152-23
R-626	Resistor, Pot. 806K, 1/4w	131-8063-23
R-627	Resistor, 10KΩ, 1w	130-0103-45
R-628	Resistor, 22Ω, 1/4w	130-0220-25
R-629	Resistor, 470Ω, 1/2w	130-0471-35
R-631	Resistor, 2.7MΩ, 1/4w	130-0275-23
R-633	Resistor, 1KΩ, 1/4w	130-0102-25
R-634	Resistor, 619KΩ, 1/4w	131-6193-23
R-635	Resistor, 68KΩ, 1/4w	130-0683-23
R-636	Resistor, W/W, 100Ω, 2w	132-5002-00
R-637	Resistor, W/W, 270Ω, 2w	132-5003-00
S-601	Switch, ON-OFF (Vol.C	031-0034-00
S-602	Switch, Slide 4PDT	031-0035-01
S-603A, B, C	Switch Wafer (Vol. Con.)	See: S-601
S-604A, B, C	Switch Wafer (Vol. Con.)	See: S-601
S-605A, B	Switch Wafer, 12 Posi.	031-0033-00
S-606A, B	Switch Wafer, 12 Pos.	031-0033-00
T-601	Transformer, Power	019-7010-02
V-601	Electron Tube, Spl.	021-0023-00
V-602	Electron Tube, 6CB6	021-0003-00
V-603	Electron Tube, 5783	021-0019-00

MISCELLANEOUS PARTS

	Contact, Crystal	047-1029-00
	Contact, Spring	047-1102-00
	Crystal Ret. Ring Assy.	047-1121-00
	Detent Spring, Straight	047-1126-00
	Detent Spring, Bent	047-1126-01
	Ground Clip, Mc Shaft	047-1129-00
	Divider, RF	047-1131-00
	Inductor, Rec. RF	047-1132-00
	Divider, RF	047-1133-00
	Plate Tank Base	047-1134-00
	Plate Tank	047-1135-00
	Modulator Cover	047-1136-00
	Cover, RF	047-1137-00
	Mounting Plate, Front	047-1138-00
	Mounting Plate, Rear	047-1140-00
	Side Plate, Left	047-1141-00
	Side Plate, Right	047-1142-00
	Shield, IF	047-1144-00
	Decal, FCC Tag	057-1044-00
	Decal, WARNING	057-1040-00
	Decal, WARRANTY	057-1041-00
	Cable Marker "DME"	057-1043-00
	Name Plate, KN-60	057-1031-00
	Identification Tag	
	Without Serial No.	057-1035-00
	With Serial No.	057-1035-01
	Tube Location Tag	057-1036-00
	Cam Following Arm	073-0009-00
	Following Arm Adj.	073-0010-00
	Kc Cam Follower	073-0011-00
	Mc Selector Knob	088-0031-00
	Range/Speed Selector	088-0031-04
	Kc ON/OFF Knob	088-0032-02
	Kc Knob (.0 to .9)	088-0032-03
	Front Cover	088-0033-00
	Xtal Holder & Sw. Det	088-0036-00
	Xtal Contact Holder	088-0037-00
	Insulating Cap	088-0045-00